accumulations extending from just below the town of Lewes on Delaware Bay, for about the distance of a mile or more to the base of a huge sand dune between the bay shore and the light-house of Cape Henlopen. They had provided themselves with ample means to examine the extent of the shell heaps, and had been surprised to find that they were all quite superficial, from a few inches to less than a foot in depth. In a number of places they appeared to form hillocks, but they were only accumulations around the former sites of trees, as indicated by the traces of stumps and roots.

They visited similar accumulations on the shore south of the Cape, and were told that they were found in many positions down the coast.

All of those which were examined contained fragments of pottery, chips of jasper, and stone arrow-heads. A few copper rings were also found, and in one heap Mr. Canby found several English coins.

Dr. Leidy thought the shell-heaps were of no great age, and were probably cotemporary with the discovery of the country by Europeans.

October 30th.

MR. VAUX, Vice-President, in the Chair.

Twenty-six members present.
Drs. William Mayburry, and W. C. Dixon were elected members.

Dr. Hayden, having just returned from a tour of exploration to the "Mauvaises Terres," or "Bad Lands" of White River, made some remarks in regard to a side trip to the celebrated Pipestone quarry of North-eastern Dakota. He spoke of the locality as very inconspicuous, and that it would have hardly attracted attention had the existence of this Pipestone bed not been known to exist there. Not a tree is to be seen in the region round about, only a few small bushes growing among the rocks. There is an escarpment, or nearly vertical wall, extending across the valley of Pipestone creek nearly a quarter of a mile either end of this wall, gradually passing from view beneath the prairie. The entire thickness of the rocks is about 50 feet. The Pipestone layer is about 11 inches in thickness; about $2\frac{1}{4}$ inches is homogenous and compact enough to be used by the Indians for the manufacture of Pipes. The remainder is of various colors and texture, from a deep red to a cream, and oftentimes mottled. The rock is soft, slaty, fragile, and underneath the Pipestone is a bed of close-grained grey quartzite; above there is about 5 feet of the same rock, which must be removed with great labor before the precious material can be secured. Still higher are 40 or 50 feet of reddish and variegated quartzites, which, like the pipestone itself, are colored with peroxide of iron.

It is difficult to come to any positive conclusion as to the age of these rocks, from the fact that no well defined organic remains could be found. It is the opinion of the eminent geologist, Prof. Hall, that they belong to the Huronian series, and, from his large experience among those rocks, and the fact also that he describes similar quartzites at a point within 60 or 70 miles of the quarry, entitles his opinion to great weight. Rocks of the same age occur at Sioux Falls, and upon the smooth surfaces may be seen, in great numbers, the outlines of what appear to be bivalve shells, but so close grained is the quartzose matrix that no well-defined shell could be broken from it. If these rocks are really charged with fossils, we are led to look higher in the geological scale for the true age of the Pipestone bed.

Dr. H. remarked, in regard to the time of the opening of this quarry by the Indians, he does not think they had any knowledge of the rock far back in the past. No trace of stone implements were discovered in the vicinity, and he could not ascertain that any had ever been found. Mr. Vaux, Vice-President of the Academy, has examined large collections of stone implements and orna-

ments from ancient Indian mounds, without ever seeing any made of the pipestone. Acting on this suggestion, Dr. H. examined such works as were within his reach, and he could not ascertain that the numerous and careful explorations of the mounds in the Mississippi Valley have as yet revealed any ornaments made from this rock. The Indians must therefore have discovered the quarry since the stone age.

Dr. H. exhibited a number of ornaments manufactured from the Pipestone by the North-west Fur Company. They consist of pipes of various patterns and sizes, cups, candlesticks, etc. They are turned in a lathe. Within a year or two this company have made nearly two thousand pipes, which they send up to the Upper Missouri Indians, near the foot of the Rocky Mountains, and trade them for a robe a-piece. Hereafter some doubt will be thrown upon the genuineness of these Indian pipes.

On favorable report of the Committee the following were ordered to be published.

On the Period and Ratio of the Annual Increase in the Circumference of Trees.

BY THOMAS MEEHAN.

The following experiments were instituted in order to ascertain whether the production of wood in trees was more rapid during some portions of the growing season than others, and at what periods growth commenced and ceased in the species of tree chosen.

The Carolina poplar (Populus monilifera *Ait.*) was selected on account of its rapid growth, enabling me to easily note the increase of circumference each seven days.

The following table shows the result. For the sake of system, the same day in the week was chosen. In order to tabulate the figures, the same date is used for the three years; but as the same day fell on different dates, there is a difference of three days in each date. For instance, May 17 in 1863 is May 18 in 1862 and May 20 in 1866—the three years during which the measurements were taken.

1866.	1862. Ft. In.	1863. Ft. In.	1866. Ft. In.
April 12 (Male catkins in flower.)			
" 15...			3·6¾
" 22. (Leaf buds burst)...........................			3·6¾
" 29...			3·6¾
May 6...		2·3	3·7
" 13...		2·3	3·7¼
" 20...		2·3¼	3·7½
" 27...	1·10	2·3⅜	3·7¾
June 3..	1·10½	omitted	3·8
" 10...	1·10¾	2·3¾	3·8¼
" 17...	1·11	2·4½	3·9⅛
" 24...	1·11¾	2·4¾	3·9¼
July 1..	2·	omitted	omitted
" 8...	2· ¼	2·5¼	3·9¾
" 15...	omitted	2·5⅝	3·10⅛
" 22...	2·1½	2·5⅞	3·10½
" 29...	2·2	2·6½	3·10⅝
Aug. 5..	2·2¼	2·6¾	3·10¾
" 12...	2·2½	2·6¾	3·10⅞
" 19...	2·2¾	2·6¾	3·11¼
" 26...	2·3	2·6¾	3·11¼
" 31...	2·3	2·6¾	3·11¼

[Oct.